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A new view of k-essence Michaël Malquarti Astronomy Centre, University of Sussex, Brighton BN1 9QJ, United Kingdom Edmund J. Copeland Centre for Theoretical Physics, University of Sussex, Brighton BN1 9QJ, United Kingdom Andrew R. Liddle Astronomy Centre, University of Sussex, Brighton BN1 9QJ, United Kingdom Mark Trodden Department of Physics, Syracuse University, Syracuse, NY 13244-1130, USA

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abstract K-essence models, relying on scalar fields with non-canonical kinetic terms, have been proposed as an alternative to quintessence in explaining the observed acceleration of the Universe. We consider the use of field redefinitions to cast k-essence in a more familiar form. While k-essence models cannot in general be rewritten in the form of quintessence models, we show that in certain dynamical regimes an equivalence can be made, which in particular can shed light on the tracking behaviour of k-essence. In several cases, k-essence cannot be observationally distinguished from quintessence using the homogeneous evolution, though there may be small effects on the perturbation spectrum. We make a detailed analysis of two k-essence models from the literature and comment on the nature of the fine tuning arising in the models.